

CLAIMS

1. A process for making a low-acid single strength juice including not from concentrate (NFC) juice, comprising:

providing an initial single strength juice flow having suspended solids;

cooling the initial juice flow to a temperature of not greater than about 45°F and maintaining the juice at or below this temperature throughout the process, except during pasteurization or enzyme deactivation, if same is practiced during the process;

diverting from the initial juice flow a first portion of said juice from a second portion of said juice;

separating out suspended solids from said first portion of juice to provide a solids-reduced juice having not greater than about 3 volume percent suspended solids based upon the total volume of the solids-reduced juice;

directing the solids-reduced juice to a supply of ion-exchange resin and deacidifying the solids-reduced juice by contact with the ion-exchange resin;

adding a portion of the initial single strength juice flow to the deacidified juice immediately after deacidification to lower the pH of the deacidified juice to a value that discourages microbial activity; and

combining the deacidified juice with said second portion of juice flow and with the separated suspended solids to

achieve a final blend, which is a low-acid single strength juice.

2. The process of claim 1 wherein the juice is an NFC citrus juice.

3. The process of claim 2 wherein the NFC citrus juice is NFC orange juice.

4. The process of claim 1 further comprising treating one or more of said initial juice flow, said first portion juice and said solids-reduced juice prior to deacidification so as to pasteurize, to reduce active enzymes in same, or both.

5. The process of claim 4 wherein said treating heat treats the juice flow to inactivate pectin esterase enzyme present in the juice.

6. The process of claim 1 wherein the separating reduces the suspended solids in the solids-reduced juice to not greater than about two volume percent, based on the total volume of the solids-reduced juice.

7. The process of claim 1 wherein the separating reduces the suspended solids in the solids-reduced juice to not greater than about one volume percent, based on the total volume of the solids-reduced juice.

8. The process of claim 1 wherein the separating out suspended solids is selected from centrifugation, membrane filtration, decanting, finishing and filtering.

9. The process of claim 1 wherein said adding an initial single strength juice flow lowers the pH of the deacidified juice to a value not greater than about 4.5.

10. The process of claim 1 wherein said adding an initial single strength juice flow is performed only when the pH of the deacidified juice is greater than or equal to about 4.5.

11. The process of claim 1 wherein said adding an initial single strength juice flow lowers the pH of the deacidified juice to a value not greater than about 4.4.

12. The process of claim 1 wherein said adding an initial single strength juice flow is lowers the pH of the deacidified juice to a value not greater than about 4.3.

13. The process of claim 1 wherein said first portion juice comprises a minor fraction of the initial single strength juice flow and second portion juice comprises a major fraction of the initial single strength juice flow.

14. A process for making a low-acid single strength juice including not from concentrate (NFC) citrus juice product comprising:

providing an initial citrus juice flow having suspended solids;

cooling the initial citrus juice flow to a temperature of not greater than about 45°F and maintaining the citrus juice at or below this temperature throughout the process, except during pasteurization or enzyme deactivation, if same is practiced during the process;

diverting from the initial citrus juice flow a first portion of the citrus juice from a second portion of the citrus juice;

separating out suspended solids from the first portion of the citrus juice to provide a solids-reduced citrus juice having not greater than about 3 volume percent suspended solids based upon the total volume of the solids-reduced citrus juice;

directing the solids-reduced citrus juice to a supply of ion-exchange resin and deacidifying the solids-reduced citrus juice by contact with the ion-exchange resin; and

combining the deacidified citrus juice with said second portion of the citrus juice flow and with the separated suspended solids to achieve a final blend, which is a low-acid not from concentrate citrus juice.

15. The process of claim 14 wherein the citrus juice is orange juice.

16. The process of claim 14 further comprising treating the initial citrus juice flow to reduce active enzymes, pasteurize same, or both.

17. The process of claim 14 further comprising treating one or more of the initial citrus juice flow, the first portion of citrus juice and the solids-reduced citrus juice prior to deacidification so as to pasteurize, reduce active enzymes in same, or both.

18. The process of claim 17 wherein said treating heat treats the initial citrus juice flow to inactivate pectin esterase enzyme present in the citrus juice.

19. The process of claim 14 wherein the separating procedure reduces the suspended solids in the solids-reduced citrus juice to not greater than about two volume percent, based on the total volume of the solids-reduced citrus juice.

20. The process of claim 14 wherein the separating procedure reduces the suspended solids in the solids-reduced citrus juice to not greater than about one volume percent, based on the total volume of the solids-reduced citrus juice.

21. The process of claim 14 wherein the separating out suspended solids is selected from centrifugation, membrane filtration, decanting, finishing and filtering.

22. A process for making a low-acid not from concentrate citrus juice product comprising:

providing an initial citrus juice flow having suspended solids;

diverting from the initial citrus juice flow a first portion of the citrus juice from a second portion of the citrus juice;

separating out suspended solids from the first portion of the citrus juice to provide a solids-reduced citrus juice having not greater than about 3 volume percent suspended

solids based upon the total volume of the solids-reduced citrus juice;

directing the solids-reduced citrus juice to a supply of ion-exchange resin and deacidifying the solids-reduced citrus juice by contact with the ion-exchange resin;

adding a portion of the initial citrus juice flow to the deacidified citrus juice immediately after deacidification to lower the pH of the deacidified citrus juice to a value that discourages microbial activity; and

combining the deacidified citrus juice with said second portion of the citrus juice flow and with the separated suspended solids to achieve a final blend, which is a low-acid not from concentrate citrus juice.

23. The process of claim 22 wherein the citrus juice is orange juice.

24. The process of claim 22 further comprising treating one or more of the initial citrus juice flow, the first portion of citrus juice and the solids-reduced citrus juice prior to deacidification so as to pasteurize, reduce active enzymes in same, or both.

25. The process of claim 22 further comprising heat treating the citrus juice flow prior to deacidification to inactivate pectin esterase enzyme present in the citrus juice.

26. The process of claim 22 wherein the separating procedure reduces the suspended solids in the solids-reduced citrus juice to less than about two volume percent, based on the total volume of the solids-reduced citrus juice.

27. The process of claim 22 wherein the separating procedure reduces the suspended solids in the solids-reduced citrus juice to less than about one volume percent, based on the total volume of the solids-reduced citrus juice.

28. The process of claim 22 wherein the separating out suspended solids is selected from centrifugation, membrane filtration, decanting, finishing and filtering.

29. The process of claim 22 wherein said adding an initial citrus juice flow lowers the pH of the deacidified citrus juice to a value not greater than about 4.5.

30. The process of claim 22 wherein said adding an initial citrus juice flow is performed only when the pH of the

deacidified citrus juice is greater than or equal to about 4.3.

31. The process of claim 29 wherein said adding an initial citrus juice flow lowers the pH of the deacidified citrus juice to a value not greater than about 4.4.

32. The process of claim 22 wherein said adding an initial citrus juice flow lowers the pH of the deacidified citrus juice to a value not greater than about 4.3.

33. A process for making a low-acid single strength juice including not from concentrate (NFC) juice, comprising:

providing an initial single strength juice flow having suspended solids and a temperature of about 45°F or below;

maintaining the juice flow at or below about 45°F during the process, except during pasteurization or enzyme deactivation, if same is practiced during the process;

separating out suspended solids from the juice flow to provide a solids-reduced juice having not greater than about 3 volume percent suspended solids based upon the total volume of the solids-reduced juice;

deacidifying the solids-reduced juice by contact with ion-exchange resin to provide a deacidified juice flow;

adding immediately to the deacidified juice flow a portion of the single strength juice flow which has an acidity greater than that of the deacidified juice flow thereby lowering the pH of the deacidified juice flow to a value that discourages microbial activity.

34. A process for making a low-acid not from concentrate (NFC) orange juice comprising:

providing an initial NFC juice flow having suspended solids and a temperature of about 45°F or below;

maintaining the NFC juice flow at or below about 45°F throughout the process, except during pasteurization or enzyme deactivation, if same is practiced during the process;

separating out suspended solids from the NFC orange juice flow to provide a solids-reduced juice having not greater than about 3 volume percent suspended solids based upon the total volume of the solids-reduced juice;

deacidifying the solids-reduced orange juice by contact with ion-exchange resin to provide a deacidified juice flow; and

adding immediately to the deacidified juice flow a portion of the initial NFC orange juice flow when same has an acidity greater than that of the deacidified juice flow thereby lowering the pH of the deacidified juice flow to a

value that discourages microbial activity, and thereby providing an NFC juice which is a low-acid orange juice.

35. A process for making a low-acid not from concentrate (NFC) orange juice comprising:

providing an initial NFC orange juice flow having suspended solids;

separating out suspended solids from the NFC orange juice flow to provide a solids-reduced juice having not greater than about 3 volume percent suspended solids based upon the total volume of the solids-reduced juice;

deacidifying the solids-reduced juice by contact with ion-exchange resin to provide a deacidified juice flow; and

adding promptly to the deacidified juice flow a portion of the NFC juice flow which has an acidity greater than that of the deacidified juice flow to thereby lower the pH of the deacidified juice flow to a value that discourages microbial activity and to thereby provide an NFC juice which is a low-acid orange juice.

36. A reduced-acid single strength juice made according to the process of claim 1, the reduced-acid juice being orange juice having a titratable acidity of not greater than about 0.6 weight percent, based upon the total weight of the orange juice.

37. A reduced-acid single strength juice made according to the process of claim 1, the reduced-acid single strength juice having an acidity lower than that of the juice which has not been so processed.

38. A reduced-acid not from concentrate (NFC) citrus juice made according to the process of claim 14, the reduced-acid citrus juice having an acidity lower than that of the citrus juice which has not been so processed.

39. A reduced-acid not from concentrate (NFC) citrus juice made according to the process of claim 22, the reduced-acid citrus juice having an acidity lower than that of the citrus juice which has not been so processed.

40. A reduced-acid not from concentrate (NFC) juice made according to the process of claim 22, the reduced-acid NFC juice being orange juice having a titratable acidity of not greater than about 0.6 weight percent, based upon the total weight of the orange juice.